

## CHOLERA

### Bioterrorism Agent Profiles for Health Care Workers

**Causative Agent:** *Vibrio cholerae* is a motile, gram negative, non-sporulating rod. Two serogroups have been identified as causing symptoms in humans: O1 and O139. These organisms grow best at a pH of 7.0 but are able to tolerate an alkaline environment. Rather than invading the intestinal mucosa, they adhere to it. The clinical syndrome is caused by the action of the cholera toxin.

**Route of Exposure:** Ingestion of water or food contaminated with cholera organisms.

**Infective Dose & Infectivity:** 10 to 500 organisms

**Incubation Period:** The incubation period for cholera ranges from four hours to five days with an average of 2-3 days.

**Clinical Effects:** Sudden onset of vomiting, abdominal distension, headache and pain with little or no fever. These symptoms are followed rapidly by profuse watery diarrhea with a "rice water" appearance (colorless with small flecks of mucous). Fluid loss may exceed five to ten liters a day, and death can result from dehydration, hypovolemia and shock. In children, coma, seizures and hypoglycemia can occur.

**Lethality:** If appropriately treated the mortality rate is less than 1%. However, if untreated the mortality rate may exceed 50%.

**Transmissibility:** Cholera is not easily spread from person to person; infected food handlers can contaminate foods and drinks; in order to be an effective biological weapon, major drinking water supplies would need to be heavily contaminated.

**Primary Contamination & Methods of Dissemination:** Natural dissemination is through fecal contamination of food or water supply.

**Secondary Contamination & Persistence of organism:** Diarrheal fluids are highly infective, however, the organism is easily killed by desiccation. It is not viable in pure water but will survive up to 24 hours in sewage and as long as six weeks in water containing organic matter. *Vibrio cholerae* can also withstand freezing for 3 to 4 days.

**Decontamination & Isolation:**

*Patients* – Patients with cholera and uncontrolled diarrhea should be managed using contact precautions that means using gloves and gowns for any contact with the patient or his environment. Good hand washing before and after glove use is essential to prevent spread of pathogens. Diapered or incontinent patients should remain on contact isolation for the duration of diarrhea symptoms. No airborne isolation of patients is necessary.

*Equipment, clothing & other objects* – *Vibrio cholerae* is readily killed by dry heat at 117° C, steam, boiling or by short exposure to ordinary disinfectants and chlorination of water. Clothing should be washed in soap and hot water.

**Outbreak control:** Quarantine is unnecessary. Any person who shared food or drink with a cholera patient should be under surveillance for five days, and objects contaminated with feces or vomitus should be disinfected prior to reuse. Feces and vomitus do not need to be disinfected if discharged into a normal sewage disposal system.

**Laboratory Testing:** *Vibrio cholerae* can be cultured from stool specimens.

**Therapeutic Treatment:** Treatment of cholera infection is through rehydration with oral or parenteral fluids. Antibiotics can be used to shorten the duration of the diarrhea and the shedding of the organism. Oral tetracycline or doxycycline should be used. If patients are infected with a tetracycline-resistant strain, ciprofloxacin or erythromycin can be used. Although tetracyclines are usually avoided in children under eight due to the concern of teeth staining, the short course of therapy is unlikely to cause problems.

**Prophylactic Treatment:** Although a vaccine exists, it is not recommended because of its partial efficacy. Household contacts with a high likelihood of secondary transmission may receive oral tetracycline or doxycycline prophylaxis. Mass antibiotic prophylaxis of whole communities is never indicated and can lead to antibiotic resistance.

**Differential Diagnosis:** The differential diagnosis for *V. cholerae* includes organisms causing secretory diarrhea such as enterotoxigenic *E. coli*, and *Vibrio parahaemolyticus*.

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For more information call (602) 364-3289

## Frequently Asked Questions About Cholera

### What is cholera?

Cholera is an acute, diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*. The infection is often mild or without symptoms, but sometimes it can be severe. Approximately 1 in 20 infected persons has severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these persons, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours.

### How does a person get cholera?

A person may get cholera by drinking water or eating food contaminated with the cholera bacterium. In an epidemic, the source of the contamination is usually the feces of an infected person. The disease can spread rapidly in areas with inadequate treatment of sewage and drinking water.

The cholera bacterium may also live in the environment in brackish rivers and coastal waters. Shellfish eaten raw have been a source of cholera, and a few persons in the United States have contracted cholera after eating raw or undercooked shellfish from the Gulf of Mexico. The disease is not likely to spread directly from one person to another; therefore, casual contact with an infected person is not a risk factor for becoming ill.

### What is the risk for cholera in the United States?

In the United States, cholera was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems. However, as a result of improved transportation, more persons from the United States travel to parts of Latin America, Africa, or Asia where they are infected by cholera. In addition, domestic foodborne outbreaks in the United States have been caused by cholera-contaminated seafood brought back by travelers.

### What should travelers do to avoid getting cholera?

The risk for cholera is very low for U.S. travelers visiting areas with epidemic cholera. When simple precautions are observed, contracting the disease is unlikely.

All travelers to areas where cholera has occurred should observe the following recommendations:

- Drink only water that you have boiled or treated with chlorine or iodine. Other safe beverages include tea and coffee made with boiled water and carbonated, bottled beverages with no ice.
- Eat only foods that have been thoroughly cooked and are still hot, or fruit that you have peeled yourself.
- Avoid undercooked or raw fish or shellfish, including ceviche.
- Make sure all vegetables are cooked; avoid salads.
- Avoid foods and beverages from street vendors.
- Do not bring perishable seafood back to the United States.

A simple rule of thumb is "Boil it, cook it, peel it, or forget it."

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(continued from previous page)

### **Is a vaccine available to prevent cholera?**

No cholera vaccines are available in the United States. Two oral vaccines are available outside of the United States however, they are not generally recommended for travelers because of the brief and incomplete immunity they offer.

### **Can cholera be treated?**

Cholera can be simply and successfully treated by immediate replacement of the fluid and salts lost through diarrhea. Patients can be treated with oral rehydration solution, a prepackaged mixture of sugar and salts to be mixed with water and drunk in large amounts. This solution is used throughout the world to treat diarrhea. Severe cases also require intravenous fluid replacement. With prompt rehydration, fewer than 1% of cholera patients die.

Antibiotics shorten the course and diminish the severity of the illness, but they are not as important as rehydration. Persons who develop severe diarrhea and vomiting in countries where cholera occurs should seek medical attention promptly.

### **What is the U.S. government doing to combat cholera?**

U.S. and international public health authorities are working to enhance surveillance for cholera, investigate cholera outbreaks, and design and implement preventive measures. The Centers for Disease Control is investigating epidemic cholera wherever it occurs and is training laboratory workers in proper techniques for identification of *V. cholerae*. In addition, the Centers for Disease Control is providing information on diagnosis, treatment, and prevention of cholera to public health officials and is educating the public about effective preventive measures.

The U.S. Agency for International Development is sponsoring some of the international government activities and is providing medical supplies to affected countries.

The Environmental Protection Agency is working with water and sewage treatment operators in the United States to prevent contamination of water with the cholera bacterium.

The Food and Drug Administration is testing imported and domestic shellfish for *V. cholerae* and monitoring the safety of U.S. shellfish beds through the shellfish sanitation program.

With cooperation at the state and local, national, and international levels, assistance will be provided to countries where cholera is present, and the risk to U.S. residents will remain small.

### **Where can a traveler get information about cholera?**

The global picture of cholera changes periodically, so travelers should seek updated information on countries of interest. The Centers for Disease Control maintains a travelers' information telephone line on which callers can receive recent information on cholera and other diseases of concern to travelers. Data for this service are obtained from the World Health Organization. The number is 877-FYI-TRIP (394-8747) or check out <http://www.cdc.gov/travel>.

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